Appliance Standards Awareness Project
American Council for an Energy-Efficient Economy
New York State Energy Research and Development Authority
Northwest Energy Efficiency Alliance

June 7, 2022

Dr. Stephanie Johnson
U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy
Building Technologies, EE-2J
1000 Independence Avenue SW, Washington, DC 20585

**RE: Docket Number EERE-2017-BT-STD-0022: Notice of Availability of Preliminary Technical Support Document for Automatic Commercial Ice Makers**

Dear Dr. Johnson:

This letter constitutes the comments of the Appliance Standards Awareness Project (ASAP), the American Council for an Energy-Efficient Economy (ACEEE), the New York State Energy Research and Development Authority (NYSERDA), and the Northwest Energy Efficiency Alliance (NEEA) on the notice of webinar and availability of preliminary technical support document (TSD) for automatic commercial ice makers (ACIMs). 87 FR 17025 (March, 25 2022). We appreciate the opportunity to provide input to the Department.

**We support the inclusion of low-capacity (<50 lb ice/24 hours) products in the ACIM scope.** In our comments on the December 2021 ACIM test procedures notice of proposed rulemaking (NOPR), we supported DOE's expansion of scope of the ACIM test procedures to include low-capacity units. We also support DOE evaluating potential standards for low-capacity ice makers. Together, these rulemakings will ensure that purchasers of low-capacity equipment have information about capacity and efficiency that is based on a standardized test procedure and that these low-capacity models meet a minimum level of efficiency.

**We encourage DOE to reconsider the max-tech levels for certain product classes.** As shown in Table 1, for three ACIM product classes, there are models listed in DOE's Compliance Certification Database (CCD) that are more efficient than the "max-tech" levels evaluated in the preliminary TSD.[1] This discrepancy is particularly large for the high-capacity (i.e., ≥800 and <4000 lb ice/24 hours) continuous, remote condensing and remote compressor, air-cooled equipment. In the NOPR, DOE presented a max-tech level reflecting 17% energy savings relative to the current Federal standard, while there is a unit currently

[1]As of 4/27/2022. https://www.regulations.doe.gov/certification-data/CCMS-4-Ice_Makers_-_Automatic_Commercial.html#q=Product_Group_s%3A%22Ice%20Makers%20-%20Automatic%20Commercial%22.

available on the market that consumes 85% less energy than the current Federal standard.[2] We encourage DOE to reevaluate the max-tech efficiency levels for the product classes in Table 1 so that they represent true max-tech levels.

**Table 1. DOE "max-tech" level and the most efficient model in the DOE CCD**

| Equipment Type | Type of cooling | Harvest rate (lb ice/24 hours) | DOE "max-tech" level (% energy use less than baseline) | Most efficient model in DOE CCD (% energy savings relative to the current standard) |
|---|---|---|---|---|
| Batch, ice-making head | Air | ≥800 and <1500 | 13% | 15% |
| Batch, self-contained | Air | >50 and <110 | 25% | 31% |
| Continuous, remote condensing and remote compressor | Air | ≥800 and <4000 | 17% | 85% |

**We encourage DOE to include an efficiency level that incorporates microchannel condensers with increased surface area for air-cooled non-remote condensing ACIMs to fully capture the potential energy savings from this design option.** In the preliminary analysis, DOE seems to be showing small energy savings from replacing a tube-and-fin condenser with a microchannel condenser for non-remote condensing product classes.[3] We understand that in these cases, DOE implemented a more compact microchannel condenser and, therefore, energy savings from increased heat exchange area were not directly considered.[4] We are concerned that by implementing a compact microchannel condenser, DOE is underestimating the potential energy savings associated with this design option.[5]

DOE suggests that larger condenser size is only feasible in remote units that lack the same space constraints as non-remote condensing units.[6] However, we understand that DOE could increase heat exchange area with a microchannel condenser without increasing the overall condenser size relative to

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[2]The current Federal standard for this product class is 5.26 kWh/100 lbs of ice, and the most-efficient model, with a capacity of 2280 lbs ice/24 hours, is rated at 0.8 kWh/100 lbs of ice. While it is a small market, four out of the 13 basic models in the DOE CCD for this product class exceed the "max-tech" level evaluated in the PTSD.

[3]For the 10 non-remote condensing product classes for which a microchannel heat exchanger was implemented as a design option, based on the information in tables in section 5.6 of the PTSD, it appears that DOE estimated energy savings of 1 to 2%.

[4]On page 5-20 of the PTSD, DOE explains that a microchannel heat exchanger would improve heat transfer by 25% compared to a tube-and-fin heat exchanger for the same heat exchanger area. However, DOE assumed that the overall heat transfer would remain constant; the small energy savings are due to a reduction in compressor energy use at a reduced condensing temperature. https://www.regulations.gov/document/EERE-2017-BT-STD-0022-0009. p. 5-20

[5] We understand that many microchannel heat exchangers are currently marketed for use as a more compact option than traditional heat exchangers. One manufacturer of microchannel heat exchangers markets their products as 'up to 35% more compact' with a 'reduced footprint': https://assets.danfoss.com/documents/95094/AD137686438157en-020401.pdf. p. 10.

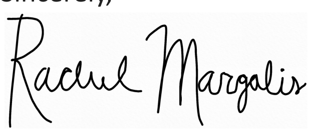
[6] https://www.regulations.gov/document/EERE-2017-BT-STD-0022-0009. p. 3-27.

the original component for non-remote condensing product classes.[7] Therefore, it seems reasonable for DOE to include an efficiency level that reflects a microchannel condenser with a less compact design than what is currently assumed in the analysis for the non-remote condensing product classes. We encourage DOE to capture these larger potential energy savings by assuming a microchannel condenser that has increased surface area (relative to the tube-and-fin condenser), while being no larger in overall dimensions than the original component.

**We encourage DOE to evaluate potential standards that include the energy use associated with ice storage.** The effectiveness of a storage bin at keeping ice cold has an indirect impact on the energy use of an ACIM–a bin that is well-insulated, meaning it has a relatively slow melt of the stored ice, will reduce the frequency of ice replacement cycles (i.e., when the ACIM is actively using energy to make and harvest ice). In our comments on the test procedures NOPR, we encouraged DOE to develop provisions to capture this energy use in the ACIM test procedures.[8] We encourage DOE to consider potential amended standards based on an amended test procedure that captures the energy use associated with ice storage.

Thank you for considering these comments.

Sincerely,



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[7] For the large remote condensing, but not remote compressor, air-cooled equipment, DOE added 6 inches of height and 1 inch to the width of the condenser (relative to the tube-and-fin) and found 9% energy savings relative to the baseline. We would expect smaller savings if a microchannel with increased surface area, but smaller in dimension, were implemented (but that the savings would be greater than those shown in the preliminary analysis).

[8] https://www.regulations.gov/comment/EERE-2017-BT-TP-0006-0015. p. 2-3.